CURRICULUM VITAE

Narendra N. Das

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Education:

Aug 2008	Ph.D., Biological and Agricultural Engineering (Focus: Hydrology and Remote Sensing), Current GPA: 4/4 Texas A&M University, College Station, TX
2005	M.S., Biological and Agricultural Engineering (Focus: Hydrology and Remote Sensing), GPA: 3.8/4 Texas A&M University, College Station, TX
1994	Bachelor of Chemical Engineering, GPA: 3.97/4 National Institute of Technology, Raipur, India (Formerly Govt. Engineering College, Raipur)

Research Experience

Currently involved in Soil Moisture Active Passive (SMAP) mission of NASA. Conducting research to develop SMAP-based ~10 km soil moisture product algorithm. Member of SMAP Algorithm development team.

Dissertation: Modeling and application soil moisture at varying spatial scales with parameter scaling
Advisor: Dr. Binayak P. Mohanty

- Adopting state-of-art techniques to study evolution of soil moisture at varying scales.
- Developing 3D-models for vadose zone hydrology and integrating it with microwave remote sensing.
- Characterization and scaling of soil hydraulic properties at varying scale i.e., field- to regional-scale.

- Characterization and study of uncertainty in backscattering coefficients of active (radar) microwave remote sensing of soil moisture.

Graduate Research Assistant, 2003 – 2005
Biological & Agricultural Engineering Dept., Texas A&M University

- Conducted hydrological studies at watershed- and regional-scale using extensive remotely sensed datasets.

- Developed algorithm and tool for assessment and assimilation of hydrologic state variables.

Thesis: Soil Moisture Modeling and Scaling Using Passive Microwave Remote Sensing
Advisor: Dr. Binayak P. Mohanty

- Developed a root zone soil moisture assessment tool (SMAT) in the ArcGIS platform by fully integrating a one-dimensional vadose zone hydrology model (HYDRUS-ET) with an ensemble Kalman filter (EnKF) having data assimilation capability for remotely sensed data.
- Investigated the scaling properties of soil moisture using airborne passive microwave remote sensing i.e., Polarimetric Scanning Radiometer data from a region having high row crop agriculture.
- The master's research resulted in three peer reviewed publications, and I also presented my research work in national conferences.

Teaching Experience

Graduate Teaching Assistant, 2005 − Present
Biological and Agricultural Engineering Department, Texas A&M University

- Teaching graduate level course of microwave remote sensing of soil moisture
- Taught labs for graduate level Vadose Zone Hydrology; held review sessions
- Assisted with graduate course for 10 students; held office hours, worked with student projects

Professional Experience:

Graduate Internship, Summer 2007
Water and Carbon Cycle Group, Jet Propulsion Lab (NASA)
California Institute of Technology, California

- Learned active/passive microwave remote sensing techniques of soil moisture
- Motivated me to conduct research to bridge the existing knowledge gaps in vadose zone hydrology and microwave remote sensing

Manager (EDP&IT), 1999 – 2002
Bhilai Steel Plant, Steel Authority of India Limited

- Managing projects for in-house IT solutions
- Developed turnkey software projects
- Supervised maintenance of software
- Upgraded and customized software to user satisfaction

Assistant Manager (EDP&IT), 1995 – 1998
Bhilai Steel Plant, Steel Authority of India Limited

- Developed IT teams
- Monitored progress of software development to meet deadlines
- Intensively involved in software development
- Organizing training courses for skill and knowledge enhancement

Grants Awarded:

- 2007-08 USGS Research Grant Recipient
  Awarded each year to a few students to conduct water related research

Projects:

- Physical controls of soil moisture and vadose zone fluxes across space-time scales under different hydro-climatic conditions, *NASA-THP*.
- A fine-scale soil water balance modeling for AMSR-E soil moisture calibration and validation, *NASA-JPL*.
- Multiscale data assimilation of soil moisture under heterogeneous soil hydraulics, *NSF-CMG*.
- Satellite remote sensing of soil moisture—Evolution of statistics with scale, *NASA-THP*.
- A fine-scale soil water balance modeling for AMSR-E soil moisture calibration and validation, *NASA-JPL*.

Field Experience:

- Participated in Soil Moisture Active Passive Validation Experiment 2008 (SMMAPVEX08), Maryland. Conducted by USDA and NASA.
  Exposure to logistics of scientific field campaign required for SMAP mission of NASA

- Participated in Soil Moisture Experiment 2005 (SMEX05), Iowa. Conducted by USDA and NASA
  Received extensive insight of field measurement and site selection in an agricultural landscape. Exposure to logistics of scientific campaign

- Participated in Soil Moisture Experiment 2004 (SMEX04), Arizona. Conducted by USDA and NASA
  Received extensive insight of field measurement and site selection in a semiarid environment. Exposure to logistics of scientific campaign

- Participated in site experiment at Honey Creek 2004, to study juniper tree infiltration characteristics at the Edwards plateau. Conducted by Biological and Agricultural Engineering Department, Texas A&M University, College Station, Texas
  Acquired experience and insight of karst hydrology

Publications:

- **Das, N.N,** and B.P. Mohanty. 2006. Root zone soil moisture assessment using remote sensing and vadose zone modeling. *Vadose Zone J. 5: 296-307*

- Zhu, J., B.P. Mohanty, and **N.N. Das.** 2006. Vadose Zone Journal. On the effective averaging scheme of the hydraulic properties at the landscape scale. *Vadose Zone J. 5: 308-316*

- **Das, N.N,** and B.P. Mohanty.2008. Modeling and Assimilation of Root Zone Soil Moisture Using Remote sensing Observation in Walnut Gulch Watershed During SMEX04. *Remote Sensing of Environment 112: 415-429*

- **Das, N.N,** and B.P. Mohanty. 2008. Scaling Properties of PSR Based Soil Moisture Fields During SMEX02: A Wavelet Approach. *Remote Sensing of Environment 112: 522-534*

- **Das, N.N,** B.P. Mohanty, and Eni Njoku. 2008. An MCMC Algorithm for Upscaled SVAT Modeling to Evaluate Satellite-based Measurements. *Water Research Resources, 44*, W05416, doi:10.1029/2007WR006472.

- **Das, N.N,** B.P. Mohanty, and Eni Njoku. Submitted 2007. Statistics and probability density functions of soil moisture across large spatial scales. *Remote Sensing of Environment*

- **Das, N.N,** B.P. Mohanty, and Y. Efendiev. Submitted 2008 (under review). Characterization of saturated hydraulic conductivity in an agricultural field using Karhunen-Loeve expansion and MCMC. *Water Research Resources*

- **Das, N.N,** B.P. Mohanty, and Eni Njoku. Submitted 2009 (under review). Characteristics of surface roughness and vegetation effect for active microwave remote sensing. *IEEE transactions of Geosciences and Remote Sensing*

- **Das, N.N,** B.P. Mohanty, and Y. Efendiev. Submitted 2008 (under review). A new multiscale data assimilation algorithm to downscale satellite-based soil moisture data. *Water Research Resources*

- **Das, N.N,** S. Chan, E. Njoku and D. Entekhabi. To be submitted 2009. A time series algorithm for merging SMAP radiometer and radar products to obtain high resolution soil moisture product. *IEEE transactions of Geosciences and Remote Sensing*

Conference Proceedings:

- Mohanty, B.P., **N.N. Das**, R.B. Jana, and A.V.M. Ines. Effective Soil Hydraulic Parameter Estimation at Different Spatial Scales, Procs. of Water, Environment, Energy, and Society (WEES), January 12-17, New Delhi, India, pp. 188-196, 2009.

Conference Presentations:

Paper Presentation (*oral*)

- **Das, N.N** and B.P. Mohanty, June 2006. Process based smoothing and scaling of AMSR-E soil moisture footprints. IEEE International Geosciences and Remote Sensing Symposium (IGARSS), Denver, Colorado

- **Das, N.N** and B.P. Mohanty, December 2006. Improving soil moisture estimate within AMSR-E footprints using MCMC-based technique and hydrological modeling. American Geophysical Union (AGU) Fall meeting, San Francisco, California

- **Das, N.N** and B.P. Mohanty, March 2007. Root zone soil moisture in the Walnut Gulch watershed during SMEX04. Student Research Week, Texas A&M University, College Station, TX

- **Das, N.N** and B.P. Mohanty, Nov 2008. Soil moisture across scales – A bottom up approach. Soil Sciences Society of America, Annual Meet, New Orleans, LA

Poster Presentations

- **Das, N.N** and B.P. Mohanty, December 2005. Scaling of surface soil moisture fields during SMEX02. American Geophysical Union (AGU) Fall meeting, San Francisco, California

- **Das, N.N** and B.P. Mohanty, December 2004. Root zone soil moisture assessment using passive microwave remote sensing and vadose zone modeling. American Geophysical Union (AGU) Fall meeting, San Francisco, California

- **Das, N.N,** B.P. Mohanty, and E. Njoku July 2008. Characterization of backscatter by surface features in L-band active microwave remote sensing of soil moisture. IEEE International Geosciences and Remote Sensing Symposium (IGARSS), Boston, Massachusetts

- **Das, N.N,** B.P. Mohanty, and Yalchin Efendiev. December 2008. A new Multi-Scale Data Assimilation Algorithm to Downscale Satellite-Based Soil Moisture Data. American Geophysical Union (AGU) Fall meeting, San Francisco, California

Professional Service and Affiliations:

- American Geophysical Union
- Soil Sciences Society of America

Honors and Awards:

- Outstanding Student Paper Award for presentation at the 2008 Fall Meeting in San Francisco.

- Recipient of 'Association of Former Students ***Distinguished Graduate Student Research Award***' in the Texas A&M University 2005
  Awarded each year to a master students at university level for excellence in research

- Recipient of 'Bill, A. and Rita L. Stout, ***International Graduate Student Achievement Award***' in the Biological and Agricultural Engineering Department, Texas A&M University, 2004
  Awarded each year to an international students for outstanding performance

- Recipient of '***Nehru Award for Excellence* in *Productivity***' EDP&IT, Bhilai Steel Plant, Steel Authority of India Ltd, 2001
  Awarded each year to a few employee for excellence in productivity

- Secured Merit position in the class of 1994 Chemical Engineering, National Institute of Technology, Raipur, India

Graduate Certification in GIS:

- ESRI ArcGIS 9.0, ArcObjects, ArcINFO, and ArcIMS
- ArcGIS Modeling Extensions: 3D analyst, Spatial analyst, Feature analyst, Geostatistical analyst, and Hydrology extension
- Satellite image processing; microwave, multi-spectral, hyper-spectral, and RADAR images

Modeling Tools & Skills:

- Kalman Filter, Ensemble Kaman Filter, Neural Network, Fourier Analysis and Wavelet Analysis
- Modeling Packages: HYDRUS (1D & 2D), SWAP
- Using aforementioned tools and model in GIS coupled environment for watershed and regional scale hydrology

Computer & Modeling Skills:

- Proficient programmer in Java, Visual basic, Fortran, Matlab, Oracle-PL/SQL, ENVI-IDL, C, and Web based programming

Community and Student Activities:

- BAEN Graduate Student Representative, Graduate Student Council, Texas A&M University, 2007 - present

- Vice President Finance of University Apartment Community Council, Texas A&M University, 2006 - 2007
- Vice President Programs of University Apartment Community Council, Texas A&M University, 2005 – 2006

References:

1. **Dr. Eni G. Njoku**
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   Jet Propulsion Laboratory
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3. **Dr. Vijay P. Singh**
   Caroline and William N. Lehrer Distinguished Chair in Water Engineering
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